REMARKS

35 USC §103

Claims 13-15 and 22-27 are rejected under 35 USC 103(a) as being unpatentable over Calhoun et al. (US Patent 5,275,856) in view of Chung (US Patent 6,399,178). The Applicant respectfully disagrees.

Claim 13 recites "a method for coupling an IC to a supporting surface comprising: a) providing an IC; b) providing a supporting surface to which the IC is to be mechanically and electrically bonded; c) **providing a pre-form assembly comprising a base layer and a sacrificial layer, the base layer comprising a thermosetting material or a thermoplastic material and wire or solder paste through conductors**; d) applying the pre-form assembly to either the IC or supporting surface; e) peeling away the sacrificial layer; f) sandwiching the base layer between the IC and the supporting surface; and g) curing the base layer."

Calhoun et al. (Calhoun) teaches electrically conductive adhesive tapes comprising at least one carrier web having a low-adhesion face bearing thereon an adhesive layer having substantially uniform thickness, said tape having a plurality of perforations, each perforation containing a plurality of electrically conductive particles in contact with the adhesive layer. Column 3, lines 38-46 further describe the electrically conductive particles as "silver or nickel, metal-coated polymeric particles and graphite". It is clearly shown in column 3 that the particles are not bound together into a solder paste or are made into a wire, since Calhoun merely mentions using organic binders and clearly does not contemplate a solder paste material. Conventional solder paste formulations comprise a metal or alloy powder, a rosin compound, a rheological additive, a solvent or solvent mixture, a surfactant or surfactant mixture, and/or a buffer or neutralizing agent. One solder paste formulation manufactured by Flip Chip consists of a Tin/Silver/Copper alloy powder, refined gum rosin, 1-phenoxy-2-propanol, Thixatrol ST™, Igepal™ CO-430, 2,2,2-nitrilotriethanol and succinic acid. This solder paste formulation is based on a lead free platform with an organic system that serves as a carrier to produce the paste form of the solder. Calhoun clearly does not contemplate this type of conventional solder paste system when he describes the use of mere organic binder materials. Furthermore, Calhoun merely describes the mixture of conductive particles as just that – a

conductive mixture. The fact that graphite and metal coated polymer particles are included in the list of preferred conductive materials is a clear indication that this substance isn't meant to be used as a solder paste, but merely as an electrical conductor.

Chung teaches an electronic device that comprises one or more electronic components, including flip-chip semiconductor devices, chip resistors, capacitors and inductors by using an adhesive underfill bonding between the electronic component and the substrate. However, the rigid adhesive underfill does not have a sacrificial layer with a release coating, as currently recited in claim 13 of the present application. Furthermore, as the Examiner points out in Paper No. 7, page 2 – Chung teaches that an adhesive preform film or sheet of thermosetting adhesive for bonding electronic components is dried or B-staged to facilitate handling and lamination to a device or substrate. Chung does not teach or suggest to one of ordinary skill in the art – whether alone or in combination with Calhoun - that a pre-form assembly can be prepared comprising a base layer and a sacrificial layer, the base layer comprising a thermosetting material or a thermoplastic material and wire or solder paste through conductors. Chung also does not motivate one of ordinary skill in the art – whether alone or in combination with Calhoun – to prepare a pre-form assembly comprising a base layer and a sacrificial layer, the base layer comprising a thermosetting material or a thermoplastic material and wire or solder paste through conductors.

Claims 13 and 22-27 are rejected under 35 USC 103(a) as being unpatentable over Tsukagoshi et al. (US Patent 4,740,657). The Applicant respectfully disagrees.

Claim 13 recites "a method for coupling an IC to a supporting surface comprising: a) providing an IC; b) providing a supporting surface to which the IC is to be mechanically and electrically bonded; c) **providing a pre-form assembly comprising a base layer and a sacrificial layer, the base layer comprising a thermosetting material or a thermoplastic material and wire or solder paste through conductors**; d) applying the pre-form assembly to either the IC or supporting surface; e) peeling away the sacrificial layer; f) sandwiching the base layer between the IC and the supporting surface; and g) curing the base layer."

Tsukagoshi teaches connection of conductors by using an adhesive composition or film capable of exhibiting anisotropic-electroconductivity comprising electroconductive particles comprising polymeric core materials coated with thin metal layers and electrically insulating adhesive components. The materials of Tsukagoshi do not comprise a base layer that comprises wire or solder paste through conductors. Furthermore, Tsukagoshi does not suggest, teach or motivate one to prepare a base layer comprising wire or solder paste through conductors, since Tsukagoshi teaches polymeric core materials coated with thin metal layers and adhesive components that cannot possibly be construed as solder paste materials or components. Therefore, based on the arguments presented above, among others, claim 13 of the present application is allowable as being patentable over Tsukagoshi. In addition, claims 22-27 are allowable as patentable over Tsukagoshi by virtue of their dependence on independent claim 13.

CHANGE OF CORRESPONDENCE ADDRESS & POWER OF ATTORNEY

Please find enclosed a copy of the Power of Attorney documents for this matter. The Power of Attorney documents were filed with the USPTO on April 28, 2003. Please note that although the firm representing the Applicant has changed, the Attorney-of-Record has not changed. Sandra Poteat Thompson (USPTO Reg. No. 46,264 and formerly Sandra Poteat) is listed on the current Power of Attorney documents for this application.

REQUEST FOR ALLOWANCE

Claims 13-15 and 22-27 are pending in this application. The applicants request allowance of all pending claims.

Respectfully submitted,

Dated: May 27, 2003

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MARKED UP VERSION SHOWING AMENDMENTS/CHANGES

IN THE CLAIMS

13. (Twice Amended) A method for coupling an IC to a supporting surface comprising:

providing an IC;

providing a supporting surface to which the IC is to be mechanically and electrically bonded;

providing a pre-form assembly comprising a base layer and a sacrificial layer, the base layer comprising a thermosetting material or a thermoplastic material and wire or solder paste through conductors[, or the base layer comprising a fiber mesh material impregnated with a thermoset];

applying the pre-form assembly to either the IC or supporting surface;

peeling away the sacrificial layer;

sandwiching the base layer between the IC and the supporting surface; and

curing the base layer.

14. The method of claim 13 wherein providing the preform assembly comprises:

providing a sacrificial layer;

coating the sacrificial later with a release coating;

applying a thermosetting material on top of the release coating;

curing the thermosetting material to form a B-stage layer; and

inserting through conductors into the thermosetting material.

15. The method of claim 14 wherein the step of inserting through conductors into the thermosetting material comprises either piercing wires into the thermosetting material, or lasing or drilling and subsequently filling holes in the thermosetting material with a solder paste.

22. The method of claim 14 wherein the release coating at least partially comprises silicon, Teflon®, or graphite release agents.

23. (Amended) The method of claim 13 wherein the base layer further comprises a fine mesh fiber material impregnated with a thermoset, and the fine mesh fiber is thermally conductive.

24. (Amended) The method of claim 13 wherein the base layer further comprises a fine mesh fiber material impregnated with a thermoset and the fine mesh fiber is electrically non-conductive.

25. (Amended) The method of claim 13 wherein the base layer further comprises a thermoset intermixed with a particle filler.

26. The method of claim 25 wherein the particle filler is thermally conductive.

27. The method of claim 25 wherein the particle filler is electrically non-conductive.